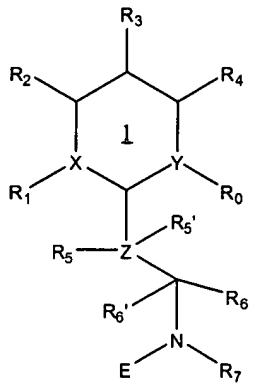
LISTING OF CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application. In amendments to the claims, additions are represented by **underlining** and deletions are represented by ~~strikethrough~~ or, in cases of five characters or fewer, by [[double brackets]].

1. (currently amended) A hydrophilic transportable dopaminergic prodrug compound according to FORMULA V,



Formula V

wherein,

Ring 1 ~~comprises an aryl or heteroaryl ring having~~ **has** 4 to 8 carbon atoms, among which atoms are counted "X" and "Y";

each of X and Y is optional; X, when present is ~~either~~ **a carbon atom,** $-C(R_1)_2-$ or ~~$-C(R_1)_2-$~~ **$-(CR_1)_2-$**; Y, when present, is ~~either~~ **a carbon atom,** $-CH_2-$ or CH_2-CH_2-;

z, R_5 and $R_{5'}$ are optional, and when present z, R_5 and $R_{5'}$ together form a lower alkyl or a substituted lower alkyl moiety;

N is part of either an amine or an amide linkage;

E is a saccharide which forms a linkage with N through a single bond from a carbon or oxygen atom thereof;

R_0 is hydrogen;

R_1 and R_4 are selected from the group consisting of hydrogen, hydroxyl, halogen, halo-lower alkyl, alkoxyl, alkoxyl-lower alkyl, halo-alkoxy, thioamido, amidosulfonyl, alkoxycarbonyl, carboxamide, aminocarbonyl, and alkylamino-carbonyl;

R_2 and R_3 are hydroxyl;

R_5 and R_6, when present, are selected from the group consisting of hydrogen, hydroxyl, alkoxyl, carbonyl, alkoxycarbonyl, aminocarbonyl, alkylamino-carbonyl and dialkylamino-carbonyl; and,

R_6 and $R_{6'}$ are selected from the group consisting of hydrogen, hydroxyl, alkoxyl, carboxyl, alkoxycarbonyl, aminocarbonyl, alkylamino-carbonyl and dialkylamino-carbonyl,

with the proviso that Ring 1 is capable of binding to any of:

a dopaminergic receptor selected from the group consisting of a D1 receptor and a D5 receptor; a DAT transporter; a VMAT transporter; and,

with the proviso that E is capable of binding to a GLUT transporter selected from the group consisting of a GLUT1 receptor and a GLUT3 receptor.

2. (currently amended) The prodrug compound of claim 1, wherein the E substituent is selected from the group consisting of a radical of a monosaccharide, a disaccharide, a trisaccharide and an oligosaccharide.

3. (original) The prodrug compound of claim 1, wherein the E monosaccharide comprises a radical of a sugar selected from the group consisting of aldose, ketoaldose, alditols, ketoses,

aldonic acids, ketoaldonic acids, aldaric acids, ketoalaric acids, amino sugars, keto-amino sugars, uronic acids, ketouronic acids, lactones and keto-lactones.

4. (currently amended) The prodrug compound of claim 3, wherein said radical of a sugar is ~~further~~ selected from the group consisting of triosyl, tetraosyl, pentosyl, hexosyl, heptosyl, octosyl and nonosyl radicals and derivatives thereof.

5. (original) The method of claim 4, wherein said pentosyl sugar radical comprises a straight carbon chain, a furanosyl ring or a derivative thereof.

6. (original) The prodrug compound of claim 4, wherein said hexosyl sugar radical comprises a straight carbon chain, a furanosyl ring, a pyranosyl ring or a derivative thereof.

7. (currently amended) The prodrug compound of claim 4, wherein said hexosyl radical is ~~further~~ selected from the group consisting of allose, altrose, glucose, mannose, gulose, idose, galactose, talose, fructose, ribo-hexulose, arabino-hexulose, lyxo-hexulose and derivatives thereof.

8. (currently amended) The prodrug compound of claim 4, wherein said pentosyl radical is ~~further~~ selected from the group consisting of ribose, arabinose, xylose, lyxose, ribulose, xylulose and derivatives thereof.

9. (currently amended) The prodrug compound of claim 4, wherein said heptosyl ~~residue~~ **radical** comprises sedoheptulose **or a derivative** ~~and derivatives~~ thereof.

10. (currently amended) The prodrug compound of claim 4, wherein said nonosyl ~~residue~~ **radical** comprises N-acetylneuraminic acid, N-glycolylneuraminic acid, diacetylneuranminic acid, **or a derivative** ~~and derivatives~~ thereof.

11. (currently amended) The prodrug compound of claim 7, further comprising glucose, galactose, fructose or **a derivative** ~~derivatives~~ thereof.

12. (currently amended) The prodrug compound of claim 2, wherein said disaccharide, trisaccharide **[[**[and]**]]** **or** oligosaccharide ~~comprise~~ **comprises** a sugar homopolymer or a sugar heteropolymer.

13. (currently amended) The prodrug compound of ~~claim 2~~ **claim 12**, wherein said sugar homopolymer comprises a glycoside selected from the group consisting of erythran, threan, riban, arabinan, xylan, lyxan, allan, altran, glucan, mannan, gulan, idan, galactan, talan, fructan **or a derivative** ~~and derivatives~~ thereof.

14. (currently amended) The prodrug compound of ~~claim 2~~ **claim 12**, wherein said sugar heteropolymer ~~further~~ comprises a glycoside selected from the group consisting of erythroside, threoside, riboside, arabinoside, xyloside, lyxoside, alloside, altroside, glucoside, mannoside, guloside, idoside, galactoside, taloside, fructoside **or a derivative** ~~and derivatives~~ thereof.

15. (currently amended) The prodrug compound of ~~claim 3~~ **claim 13**, wherein said glycoside ~~further~~ comprises a riban, an arabinan, a glucan, a galactan, a mannan **or a derivative** ~~and derivatives~~ thereof.

16. (currently amended) The prodrug compound of ~~claim 4~~ **claim 13**, wherein said glycoside ~~further~~ comprises a riboside, an arabinoside, a glucoside, a galactoside, a mannoside, a fructoside and derivatives thereof.

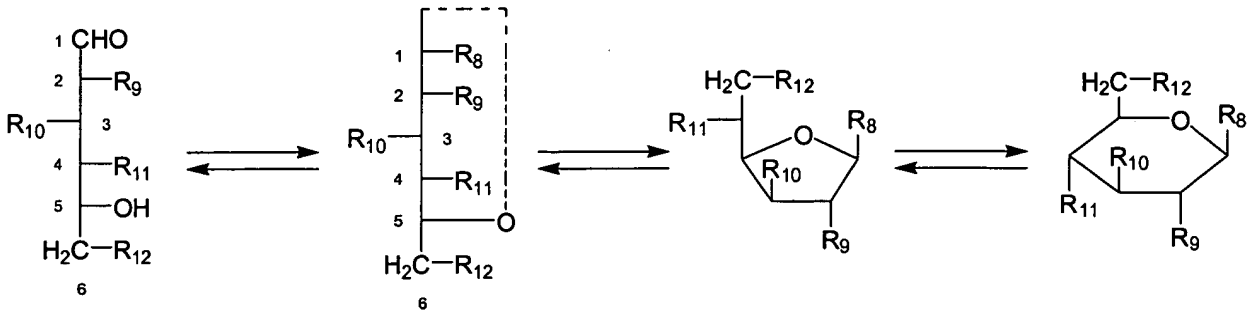
17. (currently amended) The prodrug compound of claim 15, wherein said glucan comprises maltose, amylose, glycogen, cellobiose, amylopectin, heparin **or a derivative** ~~and derivatives~~ thereof.

18. (currently amended) The prodrug compound of claim 16, wherein said glucoside comprises sucrose **or a derivative** ~~and derivatives~~ thereof.

19. (currently amended) The prodrug compound of claim 16, wherein said fructoside comprises fucosidolactose **or a derivative** ~~and derivatives~~ thereof.

20. (currently amended) The method of claim 16, wherein said galactoside comprises lactose, hyaluronic acid, pectin **or a derivative** ~~and derivatives~~ thereof.

21. (currently amended) The prodrug compound of claim 7, ~~further~~ comprising a sugar according to FORMULAS VIa, VIb, VIc and VId,



Formula VIa Formula VIb Formula VIc Formula VId

wherein R_8, R_9, R_{10}, R_{11} and R_{12} are selected from the group consisting of hydroxyl, hydrogen, hydroxyl, methyl, lower alkyl, halogen, halo-lower alkyl, alkoxyl, alkoxyl, ketone, carboxyl, amine, amido, N-acetyl, N-methyl, N-linked lower alkyl, aminocarbonyl, alkylaminocarbonyl, dialkylaminocarbonyl, and phosphate, sulfate and thiol.

22. (currently amended) The prodrug compound of claim 1, ~~further comprising a~~ **wherein the** compound ~~that~~ binds to dopamine receptor in a mammalian cell.

23. (currently amended) The prodrug compound of claim 1, ~~further comprising a~~ **wherein the** compound ~~that bind~~ **binds** to and is transportable by a DAT transporter in a neural cell.

24. (currently amended) The prodrug compound of claim 1, ~~further comprising a~~ **wherein the** compound ~~that~~ binds to and is transportable by a GLUT transporter in a neural cell or a vascular endothelial cell.

25. (currently amended) The prodrug compound of claim 1, ~~further comprising a~~ **wherein the** compound **is** transportable at the blood brain barrier by an endothelial cell.

26. (currently amended) A dopaminergic pharmaceutical composition comprising: one or more of an additive, a stabilizer, a carrier, a binder, a buffer, an excipient, a filler, an emollient, a disintegrant, a lubricating agent, **[[and]]** **or a** antimicrobial agent; and, a hydrophilic transportable dopaminergic prodrug compound according to claim 1.

27. (original) The dopaminergic pharmaceutical composition of claim 26, further comprising a form suitable for dermal administration, oral administration, buccal administration, trouch administration, parenteral administration, injection, intra-rectal administration, intrathecal administration, intra-nasal administration, intra-bronchial administration and intra-occular administration.

28. (currently amended) The dopaminergic pharmaceutical composition of claim 27, wherein said form is selected from the group consisting of a syrup, an elixir, a tablet, a lozenge**[[r]]**, a capsule, a perenteral solution, an injection solution, a nasal solution, an eye drops solution, a powder, a granule, a timed-release capsule, an emollient cream, a salve, an ointment, an impregnated bandage, a timed-release lipid soluble patch, a trouch and a suppository.

29. (currently amended) A method for preparing a pharmaceutical composition comprising the step of adding one or more of **an** additive**[[s]]**, a stabilizers, **a** carrier**[[s]]**, **a** binder**[[s]]**, **a** buffer**[[s]]**, **an** excipient**[[s]]**, **a** filler**[[s]]**, **an** emollient**[[s]]**, **a** disintegrant**[[s]]**, **a** lubricating agent**[[s]]**, or **a** antimicrobial agent**[[s]]** to a hydrophilic transportable dopaminergic prodrug compound according to claim 1.

30. (original) A hydrophilic prodrug dopaminergic pharmaceutical composition for metabolic replacement therapy in a subject with Parkinson's disease or a Parkinson's related disease comprising a compound according to FORMULA I:

A-B-D-E

Formula I

wherein,

A, comprises a cyclic, heterocyclic, aryl or heteroaryl ring capable of binding to both a dopamine receptor and a dopamine transporter in a neural cell; B, comprising a bridging lower alkyl moiety linked through single bonds with each of A and D; D, comprises an amide or an amine linked through single bonds with each of B and E; E, comprises a saccharide moiety; and,

said compound according to FORMULA I binds to and is transportable by a GLUT in a blood cell; binds to and is transportable by a GLUT in a vascular endothelial cell; binds to and is transportable by a DAT; and is capable of binding to a dopamine receptor in a neural cell.

31. (original) A method for treating a dopaminergic transcription regulatory defect in a subject in need thereof, comprising the step of administering to the subject a compound effective to bind both a GLUT and a DAT in a neural cell, wherein the activation of the GLUT or the DAT is effective to alter the transcription of a dopaminergic gene in the neural cell, wherein the dopaminergic gene is selected from the group consisting of a tyrosine hydroxylase gene, an aromatic decarboxylase gene, a monoamine oxidase gene, a DAT gene, a VMAT2 gene, a Nurr1 or a Nurr2 gene, and SP1 or SP3 gene, a dopaminergic receptor gene, a synuclein gene, and Elk gene, a Hic-5 gene, and Lmx1b gene, a Pitx3 gene, a HoxA5 gene, a HNF-3β gene and a HoxA4 gene.

32. (currently amended) A method for identifying a candidate drug substance for treating a dopaminergic transcription regulatory defect, comprising the steps of:

measuring binding or transport of a test compound by a GLUT or by a DAT transporter;

measuring transcription of a dopaminergic gene selected from the group consisting of a tyrosine hydroxylase gene, an aromatic decarboxylase gene, a monoamine oxidase gene, a DAT gene, a VMAT2 gene, a Nurr1 or a Nurr2 gene, and SP1 or SP3 gene, a dopaminergic receptor gene, a synuclein gene, and Elk gene, a Hic-5 gene, and Lmx1b gene, a Pitx3 gene, a HoxA5 gene, a HNF-3β gene and a HoxA4 gene; **and**

determining that the test compound is the candidate drug substance if the test compound is bound or transported by either of the GLUT or the DAT transporters and that the transcription of the dopaminergic gene is increased or decreased relative to a vehicle treated negative control.

33. (original) The method of claim 32, wherein the test compound is transported by a GLUT3 transporter.

34. (original) The method of claim 32, wherein the test compound increases the transcription of a tyrosine hydroxylase gene.

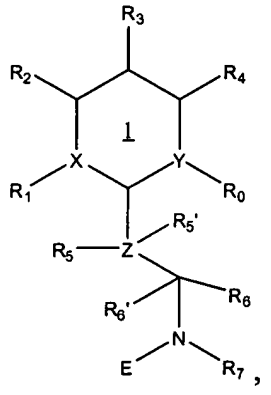
35. (original) The method of claim 32, wherein the test compound decreases the transcription of an alpha-synuclein gene.

36. (original) The method of claim 32, wherein the test compound increases the transcription of a Nurr gene.

37. (original) The method of claim 36, wherein the increased mRNA transcript of the Nurr1 gene is Nurr1 or Nurr2.

38. (original) A method for treating a tyrosine hydroxylase genetic defect in a subject in need thereof, comprising the step of administering to the subject a pharmaceutical compound transportable by both a GLUT-3 transporter and a DAT transporter in a manner effective to increase transcription of the tyrosine hydroxylase gene in the subject.

39. (new) A compound having the formula



wherein

a) Ring 1 is an optionally substituted aryl ring;

b) X and Y are carbon atoms;

c) R_0 is hydrogen;

d) R_3 is hydroxyl;

e) R_1, R_2 and R_4 are independently selected from the group consisting of hydrogen, hydroxyl, halogen, halo-lower alkyl, alkoxy, alkoxy-lower alkyl, halo-alkoxy, thioamido, amidosulfonyl, alkoxycarbonyl, carboxamide, amino-carbonyl, and alkylamine-carbonyl;

f) z is absent or a carbon atom;

g) R_5, $R_{5'}$, R_6 and $R_{6'}$ are independently selected from the group consisting of hydrogen, hydroxyl, alkoxyl, carboxyl, alkoxylcarbonyl, aminocarbonyl, alkylamino-carbonyl and dialkylamino-carbonyl;

h) N is the nitrogen atom of a primary or secondary amine or an amide;

i) R_7 is a hydrogen or methyl; and

j) E is a sugar residue having 3, 4, 5, 6, 7, 8, or 9 carbon atoms,

or a pharmaceutically acceptable salt thereof.

40. (new) The compound of claim 39, wherein N is the nitrogen atom of an amide.

41. (new) The compound of claim 39, wherein N is the nitrogen atom of a primary or secondary amine.

42. (new) The compound of claim 39, wherein z is a carbon atom.

43. (new) The compound of claim 39, wherein R_7 is a hydrogen.

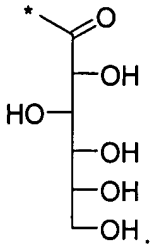
44. (new) The compound of claim 39, wherein R_2 is hydroxyl.

45. (new) The compound of claim 39, wherein R_5 or $R_{5'}$ is hydroxyl.

46. (new) The compound of claim 39, wherein the sugar residue is straight chained.

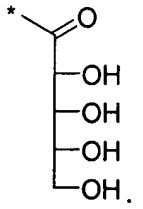
47. (new) The compound of claim 46, wherein the sugar is a straight chain hexose sugar.

48. (new) The compound of claim 39, wherein the sugar residue comprises the structure:



49. (new) The compound of claim 39, wherein E is produced from gluconolactone.

50. (new) The compound of claim 39, wherein the sugar residue comprises the structure:



51. (new) The compound of claim 39, wherein E is produced from D-(+)-ribonic acid gamma-lactone.

52. (new) The compound of claim 39, wherein:

a) R_1, R_4, R_5, $R_{5'}$, R_6, $R_{6'}$ and R_7 are hydrogen,

b) R_2 is hydroxyl,

c) z is a carbon atom, and

d) E is a residue of a straight chain hexose sugar.

53. (new) The compound of claim 39, wherein:

a) R_1, R_2, R_4, R_5, R_6, $R_{6'}$ and R_7 are hydrogen,

b) $R_{5'}$ is hydroxyl,

c) z is a carbon atom, and

d) E is a residue of a straight chain hexose sugar.

54. (new) A pharmaceutical composition comprising one or more compounds of claim 39 and a formulary agent in a dosage form suitable for administration to man or a domestic animal.

55. (new) Dopamine gluconamide or a pharmaceutically acceptable salt thereof.

56. (new) A process for making the dopamine gluconamide of claim 55 or the pharmaceutically acceptable salt thereof, the process comprising the steps of:

a) reacting gluconolactone and 3-hydroxytyramine, and

b) collecting the dopamine gluconamide or the pharmaceutically acceptable salt thereof.

57. (new) A method for treating Parkinson's disease in a subject diagnosed with a need thereof, comprising the step of administering to the subject the dopamine gluconamide of claim 55 or the pharmaceutically acceptable salt thereof in an amount effective to treat the Parkinson's disease in the subject.

58. (new) Dopamine gluconamine or a pharmaceutically acceptable salt thereof.

59. (new) A process for making the dopamine gluconamine of claim 58 or the pharmaceutically acceptable salt thereof, the process comprising the steps of:

a) providing dopamine gluconamide,

b) protecting the aromatic hydroxyl groups of the dopamine gluconamide, and

c) reducing the protected dopamine gluconamide to form the dopamine gluconamine or the pharmaceutically acceptable salt thereof.

60. (new) A method for treating Parkinson's disease in a subject diagnosed with a need thereof, comprising the step of administering to the subject the dopamine gluconamine of claim 58 or pharmaceutically acceptable salt thereof in an amount effective to treat the Parkinson's disease in the subject.

61. (new) Dopamine ribonamide or a pharmaceutically acceptable salt thereof.

62. (new) Dopamine ribonamine or a pharmaceutically acceptable salt thereof.

63. (new) A process for preparing a dopamine amide comprising:

a) reacting a lactone of a sugar and 3-hydroxytyramine, and

b) collecting the dopamine amide.

64. (new) The process of claim 63, wherein the lactone of a sugar is gluconolactone.

65. (new) The process of claim 63, wherein the lactone of a sugar is D-(+)-ribonic acid.

66. (new) A dopamine amide produced by the process of claim 63.

67. (new) A process for preparing a dopamine amine comprising:

a) providing a dopamine amide,

b) protecting the aromatic hydroxyl groups of the dopamine amide, and

c) reducing the protected dopamine amide to form dopamine amine.

68. (new) The process of claim 67, wherein the dopamine amide is dopamine gluconamide

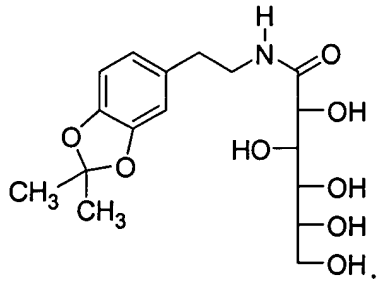
69. (new) The process of claim 67, wherein the dopamine amide is dopamine ribonamide.

70. (new) The process of claim 67, wherein the dopamine amide is dopamine gluconamine

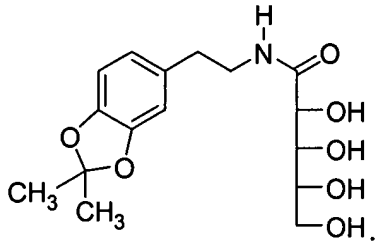
71. (new) The process of claim 67, wherein the dopamine amide is dopamine ribonamine.

72. (new) The process of claim 67, wherein the protection of the aromatic hydroxyl groups occurs by condensation of the dopamine amide with acetone to form a isopropylidene-protected dopamine amide.

73. (new) The process of claim 72, wherein the isopropylidene-protected dopamine amide has the structure:



74. (new) The process of claim 72, wherein the isopropylidene-protected dopamine amide has the structure:



75. (new) A dopamine amine produced by the process of claim 67.